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PHOTOSYNTHESIS LAB MANUAL

Hall, D. O., J. M. O. Scurlock, H. R. Bolhar-Nordenkamp, R. C. Leegood, and S. P. Long (eds.). 1993. **Photosynthesis and production in a changing environment: a field and laboratory manual**. Chapman and Hall, New York. xxvii + 465 p. \$110.00, \$156.50 (Canada) (cloth); ISBN: 0-412-42900-4 (alk. paper); \$45.00 \$56.50 (Canada) (paper), ISBN: 0-412-42910-1.

This is one of several books to appear in recent years that give useful hands-on advice on techniques of physiological plant ecology and related fields. There is much in this book to recommend it and I can imagine many different scientists, teachers, and graduate students will find something useful here.

The origins of the book lie in training courses sponsored by the United Nations Environment Programme, comprising "intensive field and laboratory courses run for three weeks at a host institution in a developing country." The aim was to teach the latest research techniques to young scientists in ecology, agriculture, forestry and aquatic systems. The outcome was an expanded and revised version of the editors' earlier book *Techniques in bioproductivity and photosynthesis* (1985. Pergamon Press, Tarrytown, New York), now bearing "a title in line with current concern over global climate change."

The book comprises 21 chapters authored by an international selection of 34 scientists from Australia, Ireland, Israel, Spain, Sweden, UK, and USA. The breadth of topics includes biophysics, biochemistry, physiology, anatomy and ecology. While not an exhaustive coverage of techniques in any one area, the techniques most relevant to the study of photosynthesis are well covered. Several chapters deal with whole plant production including chapters on remote sensing, microclimate, controlled-environment studies, and canopy structure. In addition to the expected topics dealing with photosynthesis familiar to plant ecologists there are several useful chapters on the study of functional leaf anatomy as well as chapters dealing with subcellular investigations. Other topics include carbon isotopes, polarographic oxygen measurement and nitrogen metabolism.

The model for chapter presentation is an in-depth discussion of theory, historical overview of techniques and presentation of state-of-the art practical methods. To be sure there is a degree of unevenness between chapters in the development of these sections. Some chapters, while presenting a thorough discussion of the topic have included relatively little in the way of practical methods. Others, however, present an extensive overview of techniques, including details of techniques seldom articulated in research papers. A modest literature summary is presented for each topic. While most chapters are oriented towards agricultural studies, much in the book is readily transferred to ecological settings.

This book follows relatively close on the heels of the earlier manual published in 1989 by Chapman and Hall, *Plant physiological ecology. Field methods and instrumentation* (edited by R. W. Pearcy, J. Ehleringer, H. A. Mooney, and P. W. Rundel). With one exception these two books include an entirely different array of authors, although, as to be expected, some chapters cover much of the same material in these two volumes. However, I would recommend addition of this latest book to one's library as there are a number of topics not presented in the manual by Pearcy et al. and in some cases it is instructive to observe how different authors treat the same body of material.

Almost certainly *Photosynthesis and production in a changing environment* will be of value to different readers for different reasons. I can see chapters from this book providing a ready outline for lectures on topics outside of one's main line of research. In addition, I imagine this manual being a valuable introduction to a needed technique not normally performed in one's lab. I recommend this book to graduate students and practicing scientists alike.

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